

## WHAT IS CLAIMED IS:

1. A method for fabricating a transmission balanced photomask, the method comprising:

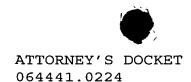
forming an alternating aperture phase shifting photomask pattern on a substrate having trenches formed therein and the substrate having an index of refraction; and

forming a layer of transmission balancing material over the substrate, the transmission balancing material having an index of refraction greater than the index of refraction of the substrate.

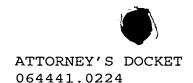
- The method of Claim 1 wherein the transmission
  balancing material further comprises spin on glass (SOG).
  - 3. The method of Claim 1 further comprising overcoating the transmission balancing material on the substrate.

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- 4. The method of Claim 1 further comprising the layer of transmission balancing material having an index of refraction greater than 1.5.
- 5. The method of Claim 1 further comprising the layer of transmission balancing material having an index of refraction approximately equal to 2.0.
- 6. The method of Claim 1 further comprising planarizing the transmission balancing layer.



- 7. The method of Claim 6 further comprising planarizing the transmission balancing layer using a chemical mechanical polishing (CMP) technique.
- 5 8. The method of Claim 1 further comprising forming an antireflective layer on the transmission balancing layer.
- The method of Claim 1 further comprising
  attaching a pellicle over the transmission balancing layer.
- 10. The method of Claim 1, wherein forming the transmission balancing layer comprises using a technique selected from the group consisting of physical vapor deposition, chemical vapor deposition, and gas phase deposition techniques.



11. A method for fabricating a phase shifting mask, the method comprising:

providing an etched transparent substrate having a recessed transmissive portion, the etched substrate having a first refractive index;

depositing an absorber layer on the etched substrate:

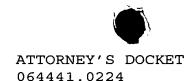
patterning the absorber layer; and

forming a transmission balancing layer on the 10 resulting patterned absorber layer, the transmission balancing layer having a second refractive index greater than the first refractive index.

- 12. The method of Claim 11, further comprising15 planarizing the transmission balancing layer.
  - 13. The method of Claim 11, wherein the transmission balancing layer comprises spin-on glass (SOG).

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- 14. The method of Claim 11 further comprising the transmission balancing layer having an index of refraction greater than 1.5.
- 15. The method of Claim 11 further comprising the transmission balancing layer having an index of refraction of approximately 2.0.



16. A phase shifting mask, comprising:

an etched transparent substrate including a recessed transmissive portion;

a patterned absorber layer deposited on the substrate; and

a transmission balancing layer formed on the patterned absorber layer, the transmission balancing layer operable to retain refracted light within recessed transmissive portion.

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17. The phase shifting mask of Claim 16, wherein the substrate has a first refractive index and the protective layer has a second refractive index greater than the first refractive index.

- 18. The phase shifting mask of Claim 16, wherein the transmission balancing layer comprises spin-on glass (SOG).
- 19. The phase shifting mask of Claim 16, wherein the substrate comprises quartz.
- 20. The phase shifting mask of Claim 16 further comprising the transmission balancing layer having an25 index of refraction approximately equal to 2.0.

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21. A method for fabricating a phase shifting mask, the method comprising:

providing an etched transparent substrate having a recessed transmissive portion;

5 depositing an absorber layer on the etched substrate;

patterning the absorber layer; and

forming a transmission balancing layer on the resulting patterned absorber layer, the transmission balancing layer having a refractive index greater than the refractive index of air.

- 22. The method of Claim 21, further comprising planarizing the transmission balancing layer.
- 23. The method of Claim 21, wherein the transmission balancing layer comprises spin-on glass (SOG).
- 24. The method of Claim 21 further comprising forming the transmission balancing layer using a technique selected from the group consisting of vacuum evaporation, magnetron sputtering, ion beam sputtering, and chemical vapor deposition.